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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,540	04/26/2001	Frank Kowalewki	1587	9344

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Striker Striker & Stenby  
103 East Neck Road  
Huntington, NY 11743

EXAMINER

DEAN, RAYMOND S

ART UNIT	PAPER NUMBER
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2684

DATE MAILED: 01/30/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/830,540

Applicant(s)

KOWALEWKI, FRANK

Examiner

Raymond S Dean

Art Unit

2684

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 - 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 3, 9, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang et al. (Vehicular Technology Conference, 1995 IEEE 45<sup>th</sup>, Volume: 1, 25 – 28 July 1995 Pages: 206 – 210 Vol. 1) in view of Herzberg et al. (5,881,108).

Regarding Claim 1, Zhuang teaches a method for transmitting signals between a first radio station and a second radio station, in which a pre-equalization of the signals to be transmitted is done in the first radio station, characterized in that the pre-equalized signals are transmitted from the first radio station to the second radio station via a radio channel (Figure 1, Section I, Section II first paragraph).

Zhuang does not specifically teach said pre-equalization being done in a modulator. Zhuang also does not teach a plurality of channels.

Herzberg teaches the method of pre-equalization being done in a modulator (Figure 2, Figure 6, Column 3 lines 6 – 23, the pre-coding/pre-equalization and channel estimation data provides the input to the transmitter, which comprises a modulator, thus

said pre-equalization is done in the modulator). Herzberg also teaches a plurality of channels (Figure 4, Figure 6, Column 3 lines 63 – 67, Column 4 lines 1 – 12, since there are a plurality of channels there will be a plurality of antennas).

Zhaung and Herzberg both teach the method of pre-equalization to overcome the Intersymbol Interference (ISI) caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and pre-equalize the signal before it is modulated as taught in Herzberg in the pre-equalization system of Zhuang as an alternative means for pre-equalizing said signal such that said ISI is eliminated or sufficiently minimized. It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the plurality of radio channels taught in Herzberg in the system of Zhuang such that an optimal ISI free wireless system is realized.

Regarding Claim 2, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 1. Zhuang further teaches one pre-equalized signal at a time is transmitted by an antenna of the first radio station and via a respective radio channel to the second radio station, wherein said radio channel is an estimate of an impulse response is ascertained in the first radio station, and a pre-equalization of the signal to be broadcast from the applicable antenna is performed as a function of the estimate of the impulse response of said radio channel (Figure 1, Section I, Section II first paragraph).

Regarding Claim 3, Zhuang teaches all of the claimed limitations recited in Claim 2.

Herzberg further teaches a reference signal that is transmitted from an antenna of the second radio station to the first radio station via the radio channels, and that the estimate of the impulse response of the respective radio channel is derived from a reception of the reference signal in the first radio station via the respective radio channel (Figure 1, Figure 4, Figure 6, Column 2 lines 37 – 43, Column 2 lines 65 – 67, Column 3 lines 1 – 5, the training sequence is the reference signal).

Regarding Claim 9, Zhuang teaches a radio station having a modulator, in which a pre-equalization of signals to be transmitted is effected in said radio station, characterized in that one antenna is provided, from which a broadcasting of the pre-equalized signals is effected, via a respective radio channel to a further radio station (Figure 1, Section I, Section II first paragraph, an antenna is needed to transmit the signal across the forward link thus an inherent antenna is taught).

Zhuang does not specifically teach a pre-equalization of signals effected in a modulator.

Herzberg teaches the method of pre-equalization being done in a modulator (Figure 2, Figure 6, Column 3 lines 6 – 23, the pre-coding/pre-equalization and channel estimation data provides the input to the transmitter, which comprises a modulator, thus said pre-equalization is done in the modulator). Herzberg also teaches at least two antennas (Column 3 lines 63 – 67, Column 4 lines 1 – 12, since there are a plurality of radio channels there will be a plurality of antennas).

Zhaung and Herzberg both teach the method of pre-equalization to overcome the Intersymbol Interference (ISI) caused by multipath fading thus it would have been

obvious to one of ordinary skill in the art at the time the invention was made to make a design preference and pre-equalize the signal before it is modulated as taught in Herzberg in the pre-equalization system of Zhuang as an alternative means for pre-equalizing said signal such that said ISI is eliminated or sufficiently minimized. It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the plurality of radio channels taught in Herzberg in the system of Zhuang such that an optimal ISI free wireless system is realized.

Regarding Claim 10, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 9. Zhuang further teaches at least one channel estimator is provided, which for each radio channel ascertains an estimate of its impulse response, and that the pre-equalization of the signal to be broadcast in the respective antenna is effected as a function of the estimates of the radio channel (Figure 1, Section I, Section II first paragraph).

Regarding Claim 12, Zhaung teaches a first radio station having one antenna, characterized in that by means of said antenna, the second radio station receives pre-equalized signals via a respective radio channel (Figure 1, Section I, Section II first paragraph, an antenna is needed to transmit the signal across the forward link thus an inherent antenna is taught).

Zhaung does not specifically teach at least two antennas.

Herzberg teaches at least two antennas (Column 3 lines 63 – 67, Column 4 lines 1 – 12, since there are a plurality of radio channels there will be a plurality of antennas).

Zhaung and Herzberg both teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the plurality of antennas taught in Haung in the system of Zhaung such that an optimal ISI free wireless system is realized.

3. Claims 4, 5 – 8, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang et al. (Vehicular Technology Conference, 1995 IEEE 45<sup>th</sup>, Volume: 1, 25 – 28 July 1995 Pages: 206 – 210 Vol. 1) in view of Herzberg et al. (5,881,108) and in further view of Huang et al. (US 6,373,832).

Regarding Claim 4, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 1. Zhuang further teaches a pre-equalized signal broadcast by the first radio station is received by an antenna of the second radio station, via a respective radio channel, and in the first radio station an estimate of a total impulse response of all the radio channel is ascertained, and a pre-equalization of the signal to be broadcast by the first radio station is performed as a function of the estimate of the total impulse response, and that the received signals formed by the antennas of the second radio station is then delivered to a demodulation (Figure 1, Section I, Section II first paragraph).

Zhuang does not teach a plurality of antennas.

Herzberg teaches a plurality of antennas (Figure 4, Column 3 lines 63 – 67, Column 4 lines 1 – 12, there are a plurality of radio channels thus a plurality of antennas).

Zhaung and Herzberg both teach the method of pre-equalization to overcome the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the plurality of antennas taught in Herzberg in the system taught in Zhuang such that an optimal ISI free wireless system is realized.

Zhaung in view of Herzberg does not teach a linear combination of received signals.

Huang teaches a linear combination of received signals (Figure 1C).

Zhaung in view of Herzberg and Huang teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the linear combining or multiplexing of the received signals taught in Huang at the second radio station of Zhaung in view of Herzberg such that the circuitry in the said second radio station is maintained at a minimum despite a plurality of received signals created by a plurality of radio channels.

Regarding Claim 5, Zhuang in view of Herzberg and in further view of Huang teaches all of the claimed limitations recited in Claim 4.

Herzberg further teaches one reference signal that is transmitted from the antennas of the second radio station to the first radio station via the associated radio



channel, and that the estimate of the total impulse response is derived from a superimposed reception of the reference signals in the first radio station (Figure 1, Figure 4, Figure 6, Column 2 lines 37 – 43, Column 2 lines 65 – 67, Column 3 lines 1 – 5, Column 3 lines 63 – 67, Column 4 lines 1 – 12, the training sequence is the reference signal, since there can be a plurality of channels there will be a plurality of reference signals that the transmitter will have to take into account in order to be properly initialized for pre-equalization thus an inherent addition or superimposition of said reference signals are taught).

Regarding Claim 6, Herzberg teaches all of the claimed limitations recited in Claim 5

Herzberg further teaches each reference signal is multiplied by a coefficient as a function of the radio channel used for its transmission, and the signals received by the antennas of the second radio station, each received signal is multiplied by the coefficient of the radio channel used for its transmission (Figure 1, Figure 4, Figure 5, Column 2 lines 65 – 67, Column 3 lines 1 – 5, Column 3 lines 63 – 67, Column 4 lines 1 – 12, there can be multiple reference signals, the Tomlinson Decoder uses the coefficients of the radio channel to decode the received signal, this is done by multiplying the received signals by said coefficients of said radio channels).

Zhaung in view of Herzberg does not teach a linear combination of received signals.

Haung teaches a linear combination of signals (Figure 1C).

Zhaung in view of Herzberg and Huang teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the linear combining or multiplexing of the received signals taught in Huang at the second radio station of Zhaung such that the circuitry in the said second radio station is maintained at a minimum despite a plurality of received signals created by a plurality of radio channels.

Regarding Claim 7, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 1.

Zhuang in view of Herzberg does not teach signals transmitted between the first radio station or the second radio station and further radio stations. Zhuang in view of Herzberg also does not teach wherein the data from different radio stations transmitted with the signals is expanded with different codes.

Huang teaches signals transmitted between the first radio station or the second radio station and further radio stations (Column 1 lines 8 – 45, this is a CDMA system thus a first radio station, second radio station, and further radio stations is inherent). Huang also further teaches wherein the data from different radio stations transmitted with the signals is expanded with different codes (Column 1 lines 8 – 45, this is a CDMA system thus the use of codes for spreading the information data is inherent).

Zhaung in view of Herzberg and Huang teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use

the CDMA system of Huang in the wireless system of Zhaung in view of Herzberg such that an optimal ISI free wireless system with a high mobile user capacity is obtained.

Regarding Claim 8, Huang teaches all of the claimed limitations recited in Claim 7.

Zhaung further teaches the ascertaining of transmission properties of radio channels from data transmissions of a radio station (Figure 1, Section I, Section II first paragraph).

Regarding Claim 11, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 9. Zhuang in view of Herzberg does not specifically teach a code generator which expands the data transmitted with the signals with a code, wherein the code generator ascertains the code as a function of a selected radio connection, and that the pre- equalization of the signal to be broadcast by the respective antenna is effected as a function of all the currently used codes.

Huang teaches a code generator which expands the data transmitted with the signals with a code, wherein the code generator ascertains the code as a function of a selected radio connection, and that the pre- equalization of the signal to be broadcast by the respective antenna is effected as a function of all the currently used codes (Column 1 lines 8 – 45, this is a CDMA system thus there is an inherent code generator and an inherent use of said codes for spreading the information data, this has the effect of pre-equalizing the signal).

Zhaung in view of Herzberg and Huang teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have

been obvious to one of ordinary skill in the art at the time the invention was made to use the above method taught in Huang in the system of Zhaung in view of Herzberg such that an optimal ISI free wireless system with the ability to support multiple subscribers is achieved.

Regarding Claim 13, Zhuang in view of Herzberg teaches all of the claimed limitations recited in Claim 12. Zhuang further teaches wherein the received signals are pre-equalized as a function of the transmission properties of the corresponding radio channels and said signals are delivered to a demodulator (Figure 1, Section I, Section II first paragraph).

Zhuang does not specifically teach the superimposition of transmission properties of the corresponding radio channels.

Herzberg teaches the superimposition of transmission properties of the corresponding radio channels (Figure 1, Figure 4, Figure 6, Column 2 lines 65 – 67, Column 3 lines 1 – 5, Column 3 lines 63 – 67, Column 4 lines 1 – 12, the training sequence is the reference signal, since there can be a plurality of channels there will be a plurality of reference signals that the transmitter will have to take into account in order to be properly initialized for pre-equalization thus an inherent addition or superimposition of said reference signals are taught).

Zhaung and Herzberg both teach the method of pre-equalization to overcome the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the reference signal taught in

Herzberg in the system of Zhaung such that the transmitter is properly initialized for optimal pre-equalization.

Zhaung in view of Herzberg does not teach a linear combination of signals.

Haung teaches a linear combination of signals (Figure 1C).

Zhaung in view of Herzberg and Huang teach an adaptive wireless system that eliminates or sufficiently minimizes the ISI caused by multipath fading thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the linear combining or multiplexing of the received signals taught in Huang at the second radio station of Zhaung in view of Herzberg such that the circuitry in the said second radio station is maintained at a minimum despite a plurality of received signals created by a plurality of radio channels.

### ***Conclusion***

4. Any inquiry concerning this communication should be directed to Raymond S. Dean at telephone number (703) 305-8998.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung, can be reached at (703) 308-7745. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology center 2600 only)

Hand –delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

*Mark Cousins*

*Reynold Lee*